
TCP/IP Network Administration

Second Edition

Craig Hunt

O'REILLY™

Cambridge · Köln · Paris · Sebastopol · Tokyo

Facebook's Exhibit No. 1016/1116

Page 1

TCP/IP Network Administration, Second Edition

by Craig Hunt

Copyright © 1998, 1992 Craig Hunt. All rights reserved.
Printed in the United States of America.

Published by O'Reilly & Associates, Inc., 101 Morris Street, Sebastopol, CA 95472.

Editor: Mike Loukides

Update Editor: Gigi Estabrook

Production Editor: Nicole Gipson Arigo

Printing History:

August 1992:	First Edition.
March 1993:	Minor corrections.
September 1993:	Minor corrections.
January 1994:	Minor corrections.
May 1994:	Minor corrections.
January 1998:	Second Edition.

Nutshell Handbook and the Nutshell Handbook logo are registered trademarks and The Java™ Series is a trademark of O'Reilly & Associates, Inc. The association of a crab and the topic of TCP/IP is a trademark of O'Reilly & Associates, Inc.

Many of the designations used by manufacturers and sellers to distinguish their products are claimed as trademarks. Where those designations appear in this book, and O'Reilly & Associates, Inc. was aware of a trademark claim, the designations have been printed in caps or initial caps.

While every precaution has been taken in the preparation of this book, the publisher assumes no responsibility for errors or omissions, or for damages resulting from the use of the information contained herein.



This book is printed on acid-free paper with 85% recycled content, 15% post-consumer waste. O'Reilly & Associates is committed to using paper with the highest recycled content available consistent with high quality.

ISBN: 1-56592-322-7

Facebook's Exhibit No. 1016/1116

Page 2

Preface

1: O

TO
A
TO
No
In
Tr
Ap
Su

2: D

Ac
Th
Su
In
Th
Ac
Pr
Su

, CA 95472.

ademarks and The
tion of a crab and the

guish their products are
, and O'Reilly &
e been printed in caps

, the publisher assumes
m the use of the

% post-consumer waste.
cycled content available

Table of Contents

<i>Preface</i>	<i>xi</i>
1: Overview of TCP/IP	1
TCP/IP and the Internet	2
A Data Communications Model	5
TCP/IP Protocol Architecture	8
Network Access Layer	11
Internet Layer	11
Transport Layer	17
Application Layer	21
Summary	22
2: Delivering the Data	23
Addressing, Routing, and Multiplexing	23
The IP Address	25
Subnets	31
Internet Routing Architecture	34
The Routing Table	36
Address Resolution	39
Protocols, Ports, and Sockets	42
Summary	47

Facebook's Exhibit No. 1016/1116

Page 3_v

3: Network Services	48
Names and Addresses	49
The Host Table	50
Domain Name Service	52
Mail Services	60
Configuration Servers	71
Bootstrap Protocol	73
File and Print Servers	76
Summary	78
4: Getting Started	80
Connected and Non-Connected Networks	81
Basic Information	83
Planning Routing	91
Planning Naming Service	94
Other Services	97
Informing the Users	100
netconfig	102
Summary	104
5: Basic Configuration	105
Kernel Configuration	105
Linux Kernel Configuration	106
The BSD Kernel Configuration File	112
The Internet Daemon	118
Summary	121
6: Configuring the Interface	123
The ifconfig Command	123
TCP/IP Over a Serial Line	137
Installing PPP	140
Installing SLIP	153
Summary	162
7: Configuring Routing	164
Common Routing Configurations	164
The Minimal Routing Table	165
Building a Static Routing Table	167
Interior Routing Protocols	173

Ext	
Gat	
Cor	
Sun	
8: Co	
BIN	
Cor	
Cor	
Usin	
Sun	
9: Co	
The	
Line	
Net	
A B	
DH	
Mar	
Mail	
Sun	
10: sen	
sen	
Run	
sen	
The	
sen	
Rew	
Mod	
Test	
Sun	
11: Tro	
App	
Diag	
Test	
Trou	
Che	
Che	

48
49
50
52
60
71
73
76
78
80
81
83
91
94
97
100
102
104
105
105
106
112
118
121
123
123
137
140
153
162
164
164
165
167
173

Exterior Routing Protocols	184
Gateway Routing Daemon	187
Configuring gated	189
Summary	200
8: Configuring DNS Name Service	202
BIND: UNIX Name Service	202
Configuring the Resolver	205
Configuring named	208
Using nslookup	221
Summary	225
9: Configuring Network Servers	226
The Network File System	226
Line Printer Daemon	240
Network Information Service	245
A BOOTP Server	250
DHCP	258
Managing Distributed Servers	263
Mail Servers	266
Summary	269
10: sendmail	271
sendmail's Function	272
Running sendmail as a Daemon	273
sendmail Aliases	274
The sendmail.cf File	276
sendmail Configuration	283
Rewriting the Mail Address	295
Modifying a sendmail.cf File	304
Testing sendmail.cf	308
Summary	318
11: Troubleshooting TCP/IP	319
Approaching a Problem	320
Diagnostic Tools	322
Testing Basic Connectivity	324
Troubleshooting Network Access	328
Checking Routing	335
Checking Name Service	341

Facebook's Exhibit No. 1016/1116

Page 5

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.